

What is claimed is:

1. An optical monitoring apparatus for use in a wavelength division multiplexing network for monitoring a wavelength division multiplexing (WDM) signal in a network system, comprising:

- 5 a pump laser;
- a WDM coupler for coupling said WDM signal and said pump laser;
- an erbium-doped fiber receiving said WDM signal and said pump laser transmitted from said WDM signal, and scanning gain profile of said WDM signal;
- a saturated tone light source for controlling said gain profile of said WDM signal; and
- 10 an optical circulator coupled with said erbium-doped fiber, receiving said saturated tone light source, and subsequently outputting an output signal with a specified frequency.

2. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1 further comprising an optical isolator for blocking light reflected back to said network system.

- 15 3. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1 further comprising a power meter downstream of said optical circulator for power measurement.

4. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1, wherein said pump laser has a wavelength of 980 nm.

- 20 5. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1, wherein the operating wavelength of said WDM signal ranges from 1534.25 nm to 1558.98.

6. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1, wherein said saturated tone light source is a distributed

feedback (DFB) laser with a frequency of 1540 nm and power of 15 dBm.

7. The optical monitoring apparatus for use in a wavelength division multiplexing network according to claim 1, wherein said gain profile comprises gain or loss profile.